WHAT IS CLAIMED IS:

1. A method comprising:

a) obtaining one or more labeled proteins, polypeptides or peptides;

b) passing the labeled proteins, polypeptides or peptides through one or more nanopores;

c) detecting labeled amino acid residues in the labeled proteins, polypeptides or peptides;

d) compiling an amino acid distance map for each type of labeled amino acid; and

e) identifying the protein based on the distance maps.

2. The method of claim 1, further comprising:

a) placing a template nucleic acid into at least one chamber, each chamber to contain a different type of labeled amino acid; and

b) producing one or more labeled proteins, polypeptides or peptides encoded by the template nucleic acid.

3. The method of claim 1, further comprising:

a) obtaining one or more proteins, polypeptides or peptides from a biological sample; and

b) labeling the proteins, polypeptides or peptides post-translationally.

4. The method of claim 1, wherein the protein, polypeptide or peptide is identified by comparing the distance maps with a library of amino acid distance maps.

5. The method of claim 1, wherein the protein, polypeptide or peptide is identified by comparing the distance maps with the sequences of known proteins.

6. The method of claim 2, wherein each chamber is operably coupled to a different set of nanopores.

7. The method of claim 1, wherein each nanopore is operably coupled to a detector.

8. The method of claim 1, wherein only one labeled protein, polypeptide or peptide passes through a nanopore at a time.

9. The method of claim 2, wherein the labeled amino acids in each chamber represent between about 0.5% and about 50% of the total amount of the same amino acid in that chamber.

10. The method of claim 1, wherein the length of time between passage of a first labeled amino acid through the nanopore and passage of a second labeled amino acid through the nanopore corresponds to the distance along the labeled protein, polypeptide or peptide between the first and second amino acids.

11. The method of claim 1, wherein the labels are selected from the group consisting of luminescent labels, fluorescent labels, phosphorescent labels, chemiluminescent labels, conductive labels, nuclear magnetic resonance labels, mass spectroscopy labels, electron spin resonance labels, electron paramagnetic resonance labels and Raman labels.

12. The method of claim 1, wherein at least one end of the labeled protein, polypeptide or peptide is attached to an identifiable label.

13. The method of claim 1, wherein said labeled amino acids are detected with a photodetector.

14. The method of claim 1, wherein said labeled amino acids are detected with an electrical detector.

15. The method of claim 2, further comprising analyzing a multiplicity of labeled proteins, polypeptides or peptides from each chamber.

16. The method of claim 1, further comprising determining at least a partial sequence of the protein, polypeptide or peptide based on the distance maps.

17. An apparatus comprising:

a) at least one sub-device, each sub-device comprising an first chamber and a second chamber, said first and second chambers separated by sensor layers, the first and second chambers of each sub-device in fluid communication through one or more nanopores; and

b) one or more detectors operably coupled to the nanopores.

18. The apparatus of claim 17, further comprising an electrode in each first and second chamber to provide an electrical potential gradient between the first and second chambers.

19. The apparatus of claim 17, further comprising a computer operably coupled to the one or more detectors.

20. The apparatus of claim 17, wherein the one or more detectors comprise a photodetector, an electrical detector and/or a voltage detector.

21. The apparatus of claim 20, wherein the one or more detectors comprise a Raman detector.

22. The apparatus of claim 17, wherein said sensor layers comprise a support layer, a photon sensing layer and two or more light opaque layers.

23. The apparatus of claim 22, further comprising a light source and an amplifier.

24. The apparatus of claim 17, wherein said sensor layers comprise at least one conducting layer and at least two insulating layers.

25. The apparatus of claim 24, wherein said conducting layer is operably coupled to one or more electrical detectors.

26. The apparatus of claim 17, wherein said nanopore is part of a nanotube or nanochannel.

27. A method comprising:

a) contacting one or more cells with a labeled subunit;

b) obtaining one or more copies of a molecule comprising labeled subunits from the cells;

c) passing the labeled molecule through one or more nanopores;

d) detecting labeled subunits on the labeled molecule;

e) compiling a subunit distance map; and

f) identifying the molecule from the distance map.

28. The method of claim 27, wherein the molecule is selected from the group consisting of a nucleic acid, oligonucleotide, protein, polypeptide, peptide, polysaccharide and lipid.

29. The method of claim 28, wherein the molecule is a protein, polypeptide or peptide and the cells are transformed with an expression vector encoding the protein, polypeptide or peptide.

30. The method of claim 27, further comprising contacting at least two groups of cells with labeled subunits, each group of cells contacted with a different type of labeled subunit.